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NOTES AND COMMENTS

MIMICRY, PREDATION AND POTENTIAL POLLINATION BY THE MANTISPID, *CLIMACIELLA BRUNNEA* VAR. *INSTABILIS* (SAY) (MANTISPIDAE: NEUROPTERA)

Mantispids are little-known members of the order Neuroptera. As the name Mantispidae implies, the adults bear considerable resemblance, at least superficially, to the more familiar Mantidae, or praying mantids. Indeed, this similarity may represent an interesting case of convergence in the insect world (Poivre, 1976). The life cycles and parasitic habits of the larvae of many species of mantispids have been previously described by a number of investigators (Batra, 1972; Hungerford, 1936; Kaston, 1938; Killebrew, 1982; Milliron, 1940; Parfin, 1958; Redborg, 1982; Rehn, 1939; Smith, 1934; Viets, 1941). However, little is known about adult mantispids. Recently, Batra (1982) studied courtship and mating in adults of the mantispid, *Climaciella brunnea,* and Opler (1981) studied polymorphism in this species. Here I report some previously unrecorded observations on mimicry, predation, and possible pollination by adults of *C. brunnea* var. *instabilis.*

Climaciella brunnea ranges from the central and western United States to Central and South America. The five morphs of this species are Batesian mimics of different species of paper wasps (*Polistes* spp.) that occur throughout its range (Opler, 1981). Adults of *C. brunnea* var. *instabilis* mimic adults of the wasp, *Polistes instabilis.* The similarity in color and pattern between model and mimic has already been described in detail by Opler (1981).

Observations were made in Meeker Co., Minnesota, from 15–30 July 1982. Although mantispids are uncommon in Minnesota, I discovered an aggregation of about 20 individuals on flowering plants of milkweed, *Asclepias syriaca* L. (Asclepiadaceae).

The adult mantispids showed two types of mimetic behavior in response to a disturbance. The first was usually exhibited when I approached a plant they were resting on. A disturbed individual would curl its abdomen beneath it and retain this position for several minutes. In this posture, with its wasp-like coloration, it strongly resembled a wasp in the stinging position. The second type of observed behavior was a startling mimetic display performed by two different individuals (Fig. 1). When threatened by the close proximity of photographic equipment, the first mantispid spread all four of its wings and held them erect in a vertical position above its body. The main part of the abdomen was expanded laterally, so that its conspicuous yellow, wasp-like stripes were even more prominent than usual. The mantispid then repeatedly catapulted its abdomen high into the air over its head and thorax

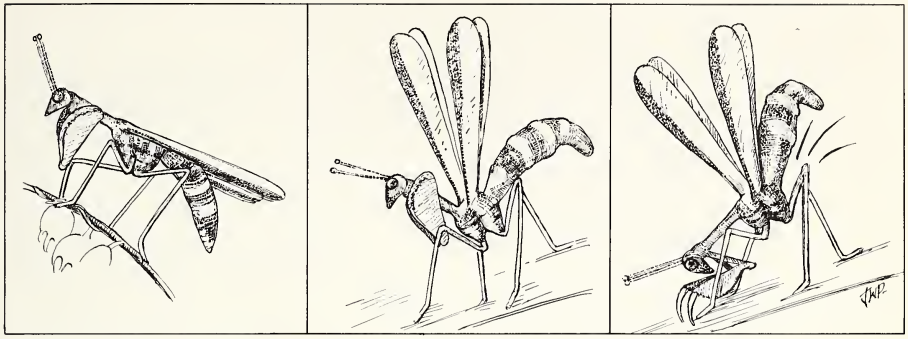

Fig. 1. Adults of the mantispid, *Climaciella brunnea* var. *instabilis* in (left) normal prey-capture position (center) mimicry display, first position, where wings are held vertically over thorax, abdomen inflated (right) mimicry display, second position, where abdomen is flipped over thorax and head.

and brought it back down again. This was done in rapid sequence, causing the insect to rock back and forth. Throughout this display, the tip of the abdomen was held downwards at nearly a right angle to the rest of the abdomen, simulating a stinging wasp. This performance lasted about 7 seconds. The display is probably designed to startle or frighten a potential predator and to show off the mantispid's vivid wasp-like warning colors, rather than to exactly simulate a wasp's behavior. The behavior of a second individual (when threatened by my finger) was similar to that of the first in all respects. To my knowledge, this is the first time such a display has been described for any mantispid species.

When hunting prey, adults of *C. brunnea* generally hung motionless on the underside of milkweed leaves or flowers. They are sit-and-wait ambush-predators that depend on the flowers to attract their prey. Their food consists of small insects, primarily flies. Prey capture occurred infrequently during the course of this study. Only three mantispids were observed with prey (small flies), although the study site was visited daily.

Each mantispid normally occupied a separate plant, but on a few occasions, several individuals were found together on the same milkweed stalk. These temporary groupings might have been breeding aggregations, attracted by the production of a pheromone by males, which is used during courtship (Batra, 1972; Eltringham, 1932).

The wasp models (*P. instabilis*) also occurred in the study area and behaved quite differently from the mantispids when searching for food. Unlike the sessile mantispids, the wasps moved quickly from plant to plant in search of prey. Their movements were jerky and aggressive. Several wasps, also hunting on plants of *A. syriaca,* captured large syrphid flies, which they quickly dismembered and ate on the spot. I observed both the wasps and

Table 1. Pollen loads of honeybees (*Apis mellifera* and mantispids (*Climaciella brunnea* var. *instabilis*) captured on milkweed plants (*Asclepias syriaca*).

		No. of pollinaria of *A. syriaca* insect was carrying	No. of corpusculae of *A. syriaca* insect was carrying
Honeybee no.	1	5	0
	2	4	0
	3	7	0
	4	5	0
	5	10	0
	6	8	1
	7	7	1
	8	6	0
	9	2	0
	10	4	0
	11	11	2
Total		69	4
Mantispid no.	1	1	0
	2	6	0
	3	0	0
	4	1	0
	5	2	0
	6	0	0
	7	0	1
	8	3	1
	9	2	0
	10	0	1
	11	0	0
Total		15	3

the mantispids drinking nectar from flowers of *A. syriaca.* As Opler (1981) suggests, the similarity of habits and habitats of wasp and mantispid may have led to the evolution of mimetic polymorphism in *C. brunnea.*

Honeybees (*Apis mellifera*) were the most frequent visitors to the milkweed flowers in the study area. For purposes of comparison, and to see if mantispids might also function as pollinators of *A. syriaca,* I captured an equal number of mantispids and honeybees and examined them for pollen.

Asclepiad flowers, like orchids, have compact pollen masses called pollinia that adhere to and are carried from flower to flower by insects. The complete set of pollinia with its associated parts (the corpusculum, or viscidium in orchids, and stipe) is known as the pollinarium. In the case of *Asclepias* flowers, the corpusculae (which are grooved, clasp-like structures) remain behind, attached to the insect's legs or body after the pollinia are given up to the flower.

Eight of the 11 mantispids examined carried *A. syriaca* pollinaria or corpusculae, while these were present on all 11 bees (Table 1). On both the bees and the mantispids these were attached to the legs or the mouthparts. Although the honeybees sampled carried many more pollinaria than the mantispids, the number of pollinia the two groups had given up was nearly equal. Thus, the mantispids, though uncommon, may function as incidental or occasional pollinators by their habit of capturing prey on milkweed flowers.—*Thomas C. Boyden, Department of Botany (KB-15), University of Washington, Seattle, Washington 98195.*

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